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MECHANICAL TECHNOLOGY INC.

December 14, 1992

Office of the Secretary of Defense  
Strategic Defense Initiative Organization  
Attn: SDIO (T/SL) (CT), The Pentagon  
Washington, D.C. 20301-7100

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Attention: Lt. Commander Daniel L. Downs  
Code SDIO/CT

Subject: SDIO Contract No. SDIO84-89-C-0043  
"High Temperature Superconducting Bearings for  
Mechanical Coolers"

Gentlemen:

Pursuant to the reporting requirements (CDRL) of the subject contract, enclosed is one copy of the monthly report covering the period 1 October 1992 to 30 October 1992.

Very truly yours,

  
Dennis J. Nealon, Manager  
Contract Administration

lb  
Enc.

cc: Major Michael Obal SDIO/SLKT (1)  
Capt. F. Origel SDIO/CT (1)  
SDIO/TNK (1)  
SDIO/POC (1)  
Martin Nisenoff, Naval Research Lab (1)  
Institute for Defense Analyses, Arlington, VA (1)  
Defense Technology Inf. Center, Alexandria, VA (1)  
Dr. Yury Flom, NASA/GSFC, Greenbelt, MD (2)  
Ms. Brenda Johnson, NRL, Washington, D.C. (1)  
J. Foley, DCASMA (letter only)

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**Monthly Report No. 35 (October 1992)**

**CONTRACT MONTHLY REPORT**

**MANHOUR EXPENDITURE CHART AND FUNDS EXPENDITURE CHART**

**PROGRAM MANAGEMENT SUPPORT**

**Contract No. SDIO84-89-C-0043**

**For Period:**

**1 October 1992 to 30 October 1992**

**Prepared For:**

**Office of the Secretary of Defense  
Strategic Defense Initiative Organization  
The Pentagon  
Washington, D.C. 20301-7100**

**Prepared By:**

**Dr. Dantam K. Rao**

**MECHANICAL TECHNOLOGY INCORPORATED  
968 Albany-Shaker Road  
Latham, New York 12110**

**St-A per telecon, Lt. Col. Obal,  
SDIO/TNI, Washington, DC 20301**

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**MANHOUR EXPENDITURE CHART AND FUNDS EXPENDITURE CHART  
PROGRAM MANAGEMENT SUPPORT**

**Monthly Report No. 35 (October 1992)**

**PERIOD OF PERFORMANCE:** 1 October 1992 to 30 October 1992

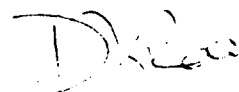
**CONTRACT NO.:** SDIO84-89-C-0043

**MTI PROJECT NUMBER:** 0470-40783

**PROGRAM OBJECTIVE:** To develop an engineering model of  
superconducting suspension.

**PREPARED FOR:** Office of the Secretary of Defense  
Strategic Defense Initiative Organization  
The Pentagon  
Washington, D.C. 20301-7100

**PREPARED BY:**



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**Dr. Dantam K. Rao**  
Project Manager

**APPROVED BY:**



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**Mr. Paul Lewis, Technical Director**  
Engineering and Technology Division

## SDIO L-505 - HIGH TEMPERATURE SUPERCONDUCTOR MONTHLY REPORT

Title of Effort: High Temperature Superconducting Bearings  
Contractor: Mechanical Technology Inc.  
968 Albany-Shaker Road  
Latham, New York 12110

Reporting Period: 1 October 1992 to 30 October 1992  
Reporting Month: September 1992  
Principal Investigator: Dr. Dantam K. Rao Phone: (518) 785-2489  
Fiscal Point of Contact: William Sumigray Phone: (518) 785-2276  
COTR: Dr. Yury Flom Phone: (301) 286-3274  
Funding Agency: SDIO

### Funding Profile

	FY-90	FY-91	FY-92
Total Requested:	<u>166,050</u>	<u>400,000</u>	<u>358,209</u>
Allocated to Date:	<u>112,000</u>	<u>365,000</u>	<u>250,000</u>
Accumulated Funds Expended to Date:		<u>738,146</u>	
Funds Expended in Reporting Month:		<u>22,053</u>	
Funds Projected for Coming Month:		<u>24,366</u>	
Total Funds Remaining as of Oct. 1992		<u>0</u>	

### Manhour Profile

Manhours Expended to Date:	<u>6,224</u>
Manhours Expended in Current Month	<u>211</u>
Manhours Projected for Coming Month	<u>260</u>

### Brief Statement of Work to be Performed:

See attached Progress Report.

### Accomplishments/Progress During Reporting Period:

See attached Progress Report

# SDIO SUPERCONDUCTING BEARINGS AND DAMPER PROGRESS REPORT

Reporting Month: October 1992

No.	Task	Accomplishment During Reporting Period	Work to be Performed Next Month
41843 -100	<p>PHASE III</p> <p>Feasibility demonstration of Superconducting bearing for hydrogen turbopump.</p>	<p>Built the radial superconducting bearings using a novel concept. The uniqueness of this bearing is that the journal is made of rings of permanent magnets and iron. The permanent magnets energize the rings, so that high gradients are developed around the periphery where the flux impinges on the superconductor surface. The tests indicate this type of bearing improves stiffness by a factor of 2 over baseline arrangement that uses a solid piece of magnetic ring on the journal.</p>	<p>Integrate the radial and axial superconducting bearings into the test rig and test the rotor fully suspended on forces from the superconductor.</p>